



## 1. Introduction

An eZee electric bicycle looks exactly like a conventional bicycle, but is fitted with a state of the art electric motor, battery and controller system. It encourages cycling through providing all the gain of conventional cycling, but without the pain. Off course, at any time the bicycle can be peddled like a normal bicycle if desired, with the electric motor augmenting the human effort. Recent advances in technology makes electric bicycles the most energy and cost efficient forms of transport available. In fact, the cost of the electricity used is less than the energy equivalent amount of food necessary to travel the same distance. With few barriers to entry and great health and fitness benefits for all, electric bicycles do not only put the fun back into cycling, but also makes great sense for millions of people around the world.

While needing only the basic skills to ride a normal bicycle, this technology is easily accessible to anyone; from the daily commuter riding to work and back to the health conscious couple going for a Sunday bicycle trip in the countryside. In addition to extreme convenience, eZee electric bicycles are quite and emit zero emissions during operation. Not only do our electric bikes point the way to the future of green transport, they are thrilling, smart and fun.

eZee SA is pioneering the electric bicycle revolution in South Africa through selling the most advanced electrical bicycles currently available in the world. eZee bikes have been proven in Europe, UK, USA, Australia and New Zealand and has repeatedly taken the top honors at electric bicycle races and events.

They have been designed from the outset by an electric bike designer whose goal is to design and build the world's best electric bike. In fact, in excess of 5 million ZAR has been spent on R&D alone, to develop the bikes proprietary electric technology. Attention to detail can be found right down to the smallest components. All our eZee electric bikes come with power packs that use 37V 10A  Lithium Manganese batteries, as standard. They are easily recharged simply by plugging into a standard wall plug. eZee bikes are built around alloy frames and use lighter battery technology, and are, on average, around 10-12kg lighter than most electric bikes. And they all come with removable batteries, making them even easier to transport on a bike rack.

Beware: Many cheaper electric bicycles with heavy steel frames and old-fashioned battery systems exist. These bikes are inefficient and usually convert more energy into heat than movement. Furthermore, quality electric bicycles are complex machines that is designed with the whole bicycle in mind. Several low quality kits exist to convert conventional bicycles into electric bicycles; these gadgets usually leads to more frustration that pleasure. Furthermore, eZee Lithium Manganese battery chemistry is different to that used in standard Lithium ion and Lithium polymer batteries that usually come with a Cobalt cathode. These are prone to thermal runaway - ie explosion and fire. The bad news is that this variant is finding its way into more and more electric bikes. Manganese, unlike Cobalt, is a safe and more environmentally benign cathode material. Even worse, cheaper Li batteries often use inadequate battery management systems and unsuitable chargers, which just compound the problems. Our supplier holds several important patents and use a very advanced battery management system.

## 2. Advantages of eZee electric bicycles

### Running Cost

eZee electric bicycles require about 250Wh to travel roughly 30km's. This translates to about 10 cents worth of electricity at current Eskom prices. This means a trip of 100 km's would cost less than 40 cents.

Additional costs to consider are regular bicycle maintenance (similar to a conventional bicycle) and the battery life reduction. The battery have a lifetime of about 500 charges, meaning about 2 years worth of full charges and discharges for a person using the bike every working day for a 50km trip. Based on the cost of a replacement battery, this ads about 8 c/km to the estimated total running cost.

### Environmentally friendly

Electric bicycles are currently the most energy efficient means of transport available to man. They emit 30 times less $CO^2$ than a small car and emit zero emissions in cities while in actual use. They are also quiet. A 100 000 electric bicycle users would save SA 18000 tons of $CO^2$ per month*.

### Clears traffic congestion

With more people using electric bicycles as a means of transport, roads will be less congested.

### Hill Climbing

A good electric bike effectively flattens hills, increasing your average speed and eliminating the 'groan' factor when a gradient comes into view. Provided you supply a reasonable amount of effort, you can expect to climb hills of 1 in 10 (10%) on an electric bike with ease, and clear a maximum gradient of 1 in 7 (14%), or much more. In hilly country, the effect is nothing short of miraculous.

### Safety

It sounds unlikely, doesn't it? But the mathematics is compelling. Think of a steep and busy road, with cars climbing at 50 km/h. If you previously slogged up the hill at 10 km/h, but can tackle the same gradient at 20km/h with an electric bike, you will see 33% fewer cars, and they will pass you slower.

Whatever the figures, there's no doubt that an electric bike helps to keep you out of danger. The same general principle applies to road junctions - the faster your acceleration, the sooner you can get out of trouble. And with no need to rush the hills, you won't be tempted to ride downhill at breakneck speed... another useful safety feature.

### Personal Fitness

Surely a conventional bike will keep you fitter? That, of course, depends how much - if at all - you use it. Research has found that 46% of conventional bikes are used only once or twice a week, with a further 30% being used once a fortnight or even less. By contrast, a recent survey of electric bicycle owners reveals that a third ride their bike at least once a day and 81% use the bike at least once a week. The figures confirm our experience that an electric bike typically gets used at least twice as often as a conventional machine. Because riding an electric bike is a great deal more enjoyable in hilly country, into strong winds, or when carrying heavy loads, users tend to make better use of them. The motor provides up to half the effort, but more regular use means more exercise for the rider.

### No Sweat!

Sweat may not be a serious issue when you're out for a leisure ride, but it's more important if you're cycling to work. Although some employers are rather grudgingly providing showers and other facilities for cyclists, the great majority have no intention of doing so. An electric bike eliminates the problem at source. In hot weather, it's possible to

maintain a normal schedule by transferring a bit more load to the electric motor. In colder weather - or if you feel in need of exercise - just throttle back, or turn the motor off.

## Genuinely Sustainable

There's a lot of nonsense talked about sustainability in transport, but an electric bicycle can be made genuinely sustainable. Purchase electricity from a 'green' supplier, or generate your own with a roof-mounted windmill or solar panel array, and the vehicles' fossil fuel consumption will be zero.

## Faster travel

In theory a car can average a high speed, but in practice speed often falls below 20km/h in cities. The problem is congestion - motorcycles get around this to some extent, but they're still confined to the road network. An electric bike can maintain a higher average speed than a bicycle but take advantage of the same network of cycle facilities, giving access to routes that cars and motorcycles cannot reach. The result is often a faster door-to-door journey time than any other mode. And by taking advantage of the uncongested cycle network, but eliminating hills and headwinds, electric bikes are often the most consistent mode of travel.

## High Resale Value

Electric bikes are new technology, and it's early days yet, but the evidence points to a much better resale value than a conventional bike.